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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,438	01/22/2002	Gregory D. U'ren	00CON134P-DIV	7270

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EXAMINER	
PHAM, LONG	
ART UNIT	**PAPER NUMBER**
2814	

DATE MAILED: 07/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H/A

Office Action Summary	Application No.	Applicant(s)	
	10/054,438	U'REN, GREGORY D.	
	Examiner	Art Unit	
	Long Pham	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *46 and 47* is/are allowed.

6)☒ Claim(s) *18-22,24-40 and 42-45* is/are rejected.

7)☒ Claim(s) *23 and 41* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 18, 19, 20, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) in combination with Shimawaki (US patent 5,321,302).

With respect to claim 18, AAPA teaches a structure comprising:

a base comprising a single crystal silicon-germanium. see pages 2-5 of the specification of this application; and

a base contact comprising polysilicon. see pages 2-5;

AAPA fails to explicitly teach a collector comprising of single crystal silicon adjacent to the base.

However, the formation of a collector comprising of single crystal silicon adjacent to a base in formation of a si-ge based HBT is well-known to one of ordinary skill in the art of making semiconductor devices.

AAPA further fails to explicitly teach an emitter comprising of polysilicon adjacent to the base.

However, the formation of an emitter comprising of polysilicon adjacent to a base in formation of a si-ge based HBT is well-known to one of ordinary skill in the art of making semiconductor devices.

Also with respect to claim 18, the processing limitation of "wherein said base contact and said base are characterized by a controlled deposition ratio" is not given weight in the determination of patentability of structure claim 18.

Also with respect to claim 18, since AAPA teaches the claimed structure and since the claimed base contact and base are inherently characterized by a deposition ratio, the base contact inherently has a reduced resistance.

Note that the processing limitations recited in structure claim 18 have been given no weight in the determination of patentability of claim 18.

Further with respect to claim 18, AAPA fails to teach that the thickness of the base contact is greater than the thickness of the base.

Shimawaki teaches a heterojunction device in which the thickness of the base contact is greater than the thickness of the base. See claim 13.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the above teaching of Shimawaki into the device of AAPA to improve the cut-off frequency and maximum oscillation frequency. See col. 2, lines 25-28.

With respect to claims 19-22, the processing limitations recited in structure claims 19-22 have been given no weight in the determination of patentability of claims 19-22.

2. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA.

With respect to claim 24, AAPA fails the base contact resistance is 650 ohms per micrometer.

However, However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal values for the base contact resistance through routine experimentation and optimization to obtain optimal or desired device performance because is result-effective variables and there is no evidence indicating that it is critical or produces

any unexpected results and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

3. Claims 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA).

With respect to claims 25 and 26, AAPA teaches a structure for forming a heterojunction bipolar transistor comprising:

a single crystal region situated over a first area. see pages 2-5 of the specification of this application; and

a polysilicon region situated over a second area.

Also with respect to claim 25, the processing limitation of "wherein said polycrystalline region and said single crystal region are characterized by a controlled deposition ratio" is not given weight in the determination of patentability of structure claim 25.

Also with respect to claim 25, since AAPA teaches the claimed structure and since the claimed base contact and base are inherently characterized by a deposition ratio, the base contact inherently has a reduced resistance.

With respect to claim 28, AAPA further teaches that the single crystal region comprises of silicon-germanium and the polysilicon region comprises polysilicon silicon-germanium.

With respect to claim 29, AAPA further teaches that the single crystal region or base is in contact in the polysilicon silicon-germanium or base contact.

With respect to claim 30, AAPA further teaches that the single crystal region is a base in a heterojunction bipolar transistor.

With respect to claim 31, AAPA further teaches that the polysilicon region is

The processing limitations recited in structure claims 25, 27, and 32-35 have

been given no weight in the determination of patentability of claims 25, 27, and 32-35.

Further with respect to claim 25, AAPA fails to teach that the thickness of the base contact is greater than the thickness of the base.

Shimawaki teaches a heterojunction device in which the thickness of the base contact is greater than the thickness of the base. See claim 13.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the above teaching of Shimawaki into the device of AAPA to improve the cut-off frequency and maximum oscillation frequency. See col. 2, lines 25-28.

4. Claims 36, 37-40, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA).

With respect to claim 36, AAPA teaches a structure comprising:

a base comprising a single crystal silicon-germanium. see pages 2-5 of the specification of this application; and

a base contact comprising polysilicon. see pages 2-5;

AAPA fails to explicitly teach a collector comprising of single crystal silicon adjacent to the base.

However, the formation of a collector comprising of single crystal silicon adjacent to a base in formation of a si-ge based HBT is well-known to one of ordinary skill in the art of making semiconductor devices.

AAPA further fails to explicitly teach an emitter comprising of polysilicon adjacent to the base.

However, the formation of an emitter comprising of polysilicon adjacent to a base in formation of a si-ge based HBT is well-known to one of ordinary skill in the art of making semiconductor devices.

Also with respect to claim 36, the processing limitation of "wherein said base contact and said base are characterized by a controlled deposition ratio" is not given weight in the determination of patentability of structure claim 36.

Also with respect to claim 36, since AAPA teaches the claimed structure and since the claimed base contact and base are inherently characterized by a deposition ratio, the base contact inherently has a reduced resistance.

Note that the processing limitations recited in structure claim 36 have been given no weight in the determination of patentability of claim 36.

Note that the processing limitations recited in structure claims 37-40 have been given no weight in the determination of patentability of claims 37-40.

Further with respect to claim 36, AAPA fails to teach that the thickness of the base contact is greater than the thickness of the base.

Shimawaki teaches a heterojunction device in which the thickness of the base contact is greater than the thickness of the base. See claim 13.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the above teaching of Shimawaki into the device of AAPA to improve the cut-off frequency and maximum oscillation frequency. See col. 2, lines 25-28.

5. Claims 42, 43, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA.

With respect to claim 42, AAPA fails the base contact resistance is 650 ohms per micrometer.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal values for the base contact resistance through routine experimentation and optimization to obtain optimal or desired device performance because is result-effective variables and there is no evidence indicating that it is critical or produces any unexpected results

and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claim 45, the use of polysilicon as emitter material is well-known to one of ordinary skill in the art of making semiconductor devices.

With respect to amended claim 43, it is well-known that a base contact is located over base region.

Allowable Subject Matter

6. Claims 46 and 47 are allowed.

7. Claims 23 and 41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on M-F, 7:30AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Pham
Primary Examiner
Art Unit 2814

LP